Blanket peat

BLANKET PEAT

Peter Wilson explains the origins of blanket peat and why this remarkable substance deserves our respect and protection in the mountain environment.

Above: Blanket peat terrain occupying the low, broad ridges of the north Sperrin Mountains.

Below: Detail of a pine stump exposed by peat erosion. The scale bar is 30 cm in length.

It goes without saying that every hillwalker in Ireland must have experienced blanket peat terrain at some time because it occurs in all our upland areas. Commonly referred to as bog, it is extensive and thick on the gentle slopes that surround the hills and on the broad ridges and plateaux that characterise summit areas. Only where the slope gradient exceeds about 20-25 degrees is this thick peat normally absent.

Because of its ability to retain water, peat-covered ground makes for rather soft and tiring walking. This is even more so where bog vegetation has been denuded and walkers are faced with acres of black peat, often dissected by gullies. There are numerous stories of walkers sinking up to their knees or hips, having stepped on what they thought was firm ground. Extrication can be a slow and dirty business.

However, even if you haven't experienced the delights of cold, waterlogged peat on your inner thighs, you will at least have had peat oozing into *your boots at some time. For these reasons, much cursing and swearing is frequently directed at peat,* even by the most mild-mannered of people.

Nevertheless, peat is also a remarkable substance, providing, as it does, a record of former climate and vegetation, and a habitat for plants and animals, without which our uplands would be much poorer.

In addition, peat is hugely important in relation to the environment. The ability of peat to retain water and regulate its release is of great significance, as is the role it plays in carbon storage and greenhouse gas control.

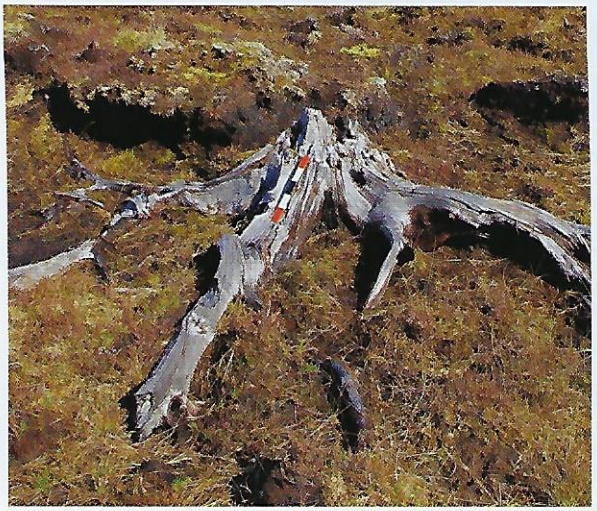
Before the peat

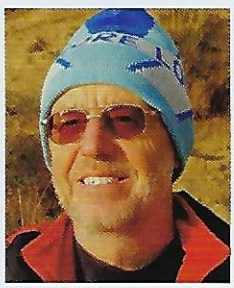
Peat was not always present on the hills. As the uplands emerged from the last episode of glaciation, lower hill-slopes had a cover of glacial sediments, with steeper slopes and summits showing much more of the rock skeleton than they do now. Gradually, as the climate continued to warm, the hillsides were colonised by trees and shrubs, some of which extended onto the high plateaux.

The remains of these ancient woodlands can sometimes be seen where peat has been cut away by humans or eroded. At lower levels, much of the woody material consists of the tough stumps and roots of pine. At higher levels, tree remains tend to be less frequent at the base of the peat, but where present they usually consist of pieces of birch, which are softer and more fragile than the pine. In contrast, the so-called bog oaks are generally associated with the raised bogs that occupy low-lying areas of the landscape, particularly the midlands.

Climate change or human impact?

The replacement of the upland woods by heathland species and the extensive accumulations of peat occurred at different times in different areas. ▶





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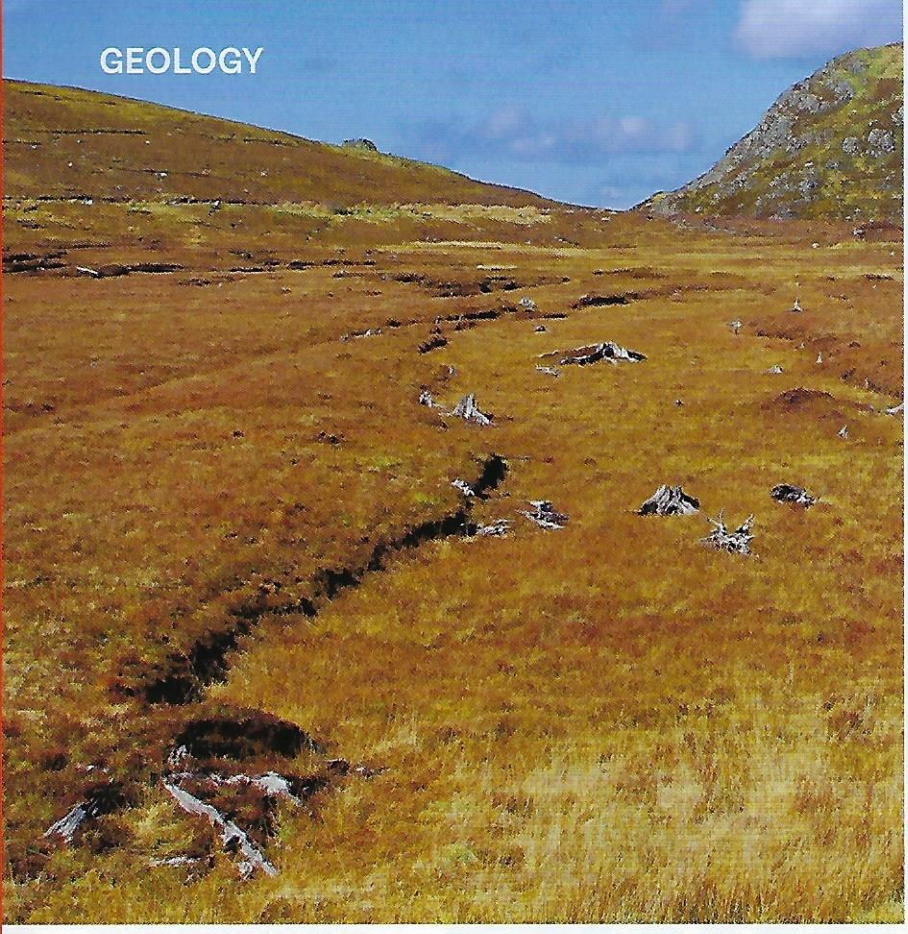
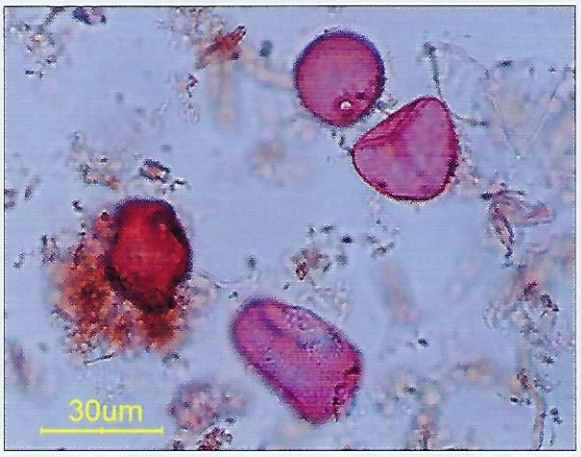




Pollen grains extracted from blanket peat (clockwise from top): grass, *Sphagnum*, sedge, hazel. Photo courtesy of Dr Gill Plunkett, Queen's University, Belfast.

Why the woodlands declined at the expense of heath and peat has been debated for many years. Some scientists believe a change to cooler and wetter conditions caused the trees to die. Others point the finger at woodland clearance and the subsequent decline in soil fertility brought about by Neolithic and Bronze Age farming communities some 6,000-2,500 years ago, as appears to be the case at the Céide Fields in north Mayo. There are yet others who think the change resulted from a combination of the two.

Radiocarbon dating has shown that the spread of blanket peat on lower mountain slopes coincided with both climatic deterioration and prehistoric agricultural activity. However, on high ridges and plateaux early agriculture was probably a less important factor. Deterioration in the climate is the probable cause of peat growth in those locations.

In the east of the country, upland blanket bog generally occurs at elevations above about 250 metres, while in the west it is found above 150 metres. This east-west difference reflects the greater rainfall amounts at lower levels in the west. Furthermore, lowland blanket peat is extensive across ground below 150 metres, and even along the coast in western counties because of the high rainfall.

The term blanket bog is a very appropriate one because the peat extends and wraps itself across the landscape, following the natural undulations of the terrain, just as a giant blanket would do if cast across the hills. In the uplands blanket peat can attain thicknesses of 2-6 metres.

Above: Pine stumps exposed by peat-cutting in Donegal.

Below: Lowland blanket peat at sea level on Achill Island.

Peat composition

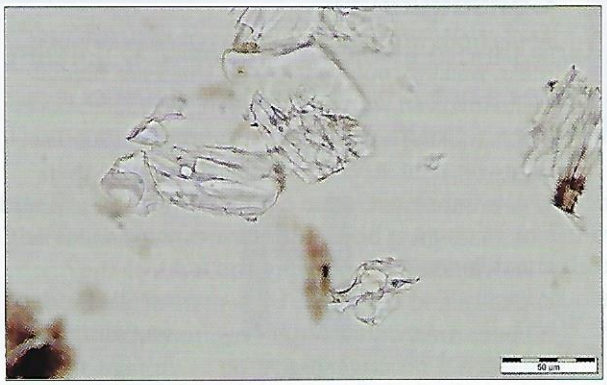
Peat is made up of the partially decomposed remains of plants. They haven't decayed completely because of the waterlogged conditions and the lack of oxygen in the bog. If you pull a lump of peat apart, the leaves, stems and fruits of plants that once grew on the bog surface will be seen. These are sometimes sufficiently well preserved to be identified without the use of a microscope or hand lens. Various heathers, grasses, sedges, bilberry and mosses (especially *Sphagnum*) make up the bulk of most blanket peat.

Throughout the development of peat, slightly warmer and drier climatic phases have alternated with slightly cooler and wetter ones. These changes are evident in peat profiles. Layers that show a high degree of plant decomposition reflect warmer and drier conditions, while layers in which plant remains are better preserved indicate cooler and wetter phases.

By examining the full thickness of peat at any location the vegetational history of the site can be established. Changes in the former vegetation over time can also be determined by treating samples of peat with reagents that digest the peat but preserve pollen grains. These pollen grains can tell us which plants grew on the bog and in the surrounding area.

Photographs: Peter Wilson

Another material that has been found in blanket bogs is volcanic ash or tephra from Icelandic volcanoes. These volcanoes have erupted many times over the past few thousand years and some of the ash has travelled towards Ireland. A recent example was the eruption of Eyjafjallajökull in April 2010, which caused widespread disruption to air travel in northern Europe. When ash eventually falls from the atmosphere some lands on bogs; it gets trapped and incorporated into the peat mass as the bog grows.



Glassy particles of tephra from blanket peat in the Mournes. The tephra is from an eruption of the Icelandic volcano Hekla 4,300 years ago. Photo courtesy of Dr Gill Plunkett, Queen's University, Belfast.

Although invisible to the naked eye, tephra can be extracted and its chemistry analysed to ascertain which volcano it came from. The associated peat layer can be radiocarbon dated to establish the timing of the eruption. Climate scientists and archaeologists have been able to link Icelandic eruptions with societal changes in Irish history and prehistory.

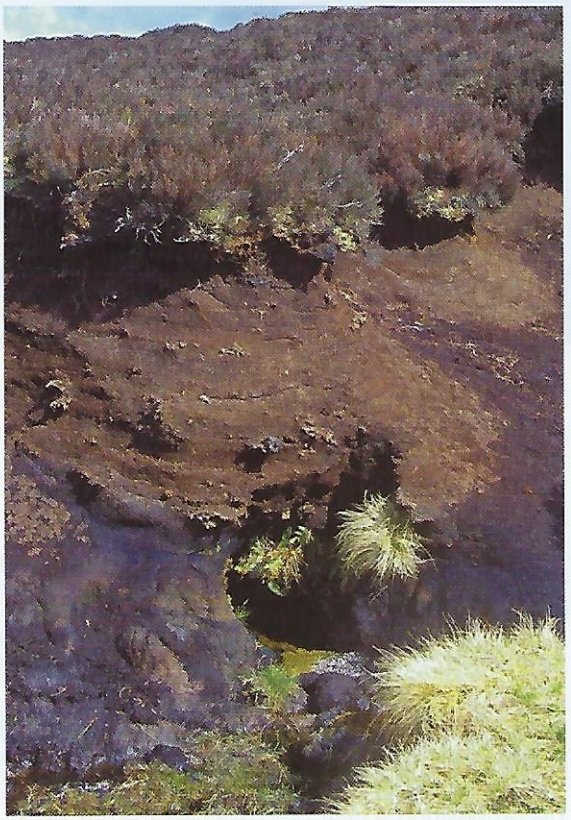
Peat erosion

The erosion of peat can be seen today on most of our hills and should be of concern to all who use the uplands, whether for recreation or to earn a livelihood. It is not a simple task to explain why and when erosion began in any particular area. Radiocarbon dating indicates that eroded peat was accumulating in lakes in Donegal and Wicklow between 1,500 and 3,000 years ago. Eroded areas must have been extensive during the era of Scandinavian settlement; the terms 'haggs' and 'groughs' for vegetation-capped residual ▶

Above: An example of severe peat erosion – haggs and groughs – on Benleagh in the Wicklow Mountains.

Right: Water emerging from a sub-peat tunnel in the Mournes.

Below: Bog burst scars on Crocknalaragagh, Co Donegal.



Photographs: Peter Wilson

peat masses and the adjacent gullies are of Norse origin.

Although the loss of some upland peat is the result of turf cutting, the badly eroded areas are usually linked with vegetation disturbance and changes in the flow of water, such as may be seen in popular hillwalking areas. If the surface vegetation is damaged by trampling or overgrazing, the exposed peat becomes susceptible to frost action in cold spells and to drying and cracking in warm periods. In both situations, the peat is broken up and can then be removed by the wind or by water flow during heavy rain. In the latter circumstance, a gully can soon be formed in the peat, and there is then little to stop it from deepening and widening.

Gullies can also be formed by water that flows in tunnels beneath the peat. As these sub-peat tunnels enlarge, the ground surface subsides along the line of the tunnel, surface vegetation is disrupted and peat becomes exposed to the influences mentioned above.

An alternative mechanism is the natural instability of the peat as it thickens. Depending on the gradient of the slope, peat thickness and degree of decomposition, a peat bog may become unstable and begin to disintegrate by slow downslope movement or creep. This may be almost imperceptible but, as it progresses, tension gashes may open up at the surface. Phases of erosion and healing are apparent from detailed examination of many bogs.

A more spectacular and rapid form of peat erosion is the so-called bog burst or bog slide. This usually occurs on moderate to steep slopes during high intensity or prolonged rainfall. Due to the excess water, the peat mass becomes unstable and moves downslope rapidly, sometimes taking fences, footpaths, trees and even roads with it. Some of these 'landslides' can extend for several hundreds of metres; they leave a depressed area, from which the peat has moved, and a tongue of peat debris deposited farther downslope.

One of the most severe cases of peat erosion in Ireland can be seen on the summit of Trostan in Co Antrim. There can be no doubt that this plateau was once peat-covered, for around its margins there are peat haggs 1-2 metres in height.

Top: The bare stony summit of Trostan, Co Antrim – the end product of peat erosion.

Above: The common sundew, an insectivorous plant of boglands.

Below: Peat erosion adjacent to the western cairn of Galtymore.

Likewise, the western cairn on the summit of Galtymore on the Cork/Tipperary border overlooks an area from which peat is being removed rapidly and may eventually disappear completely. When and how this erosion started and how long it has taken to reach this state is not known.

Consequences

Areas from which peat has been totally stripped make walking much easier, but there are several costs involved with peat erosion. As erosion takes place, walking actually becomes more arduous. Bare, wet peat is more difficult to traverse than vegetated peat. Eroded peat gets into streams and clogs spawning beds, and, if excessive, can kill fish. It is deposited in reservoirs and reduces their capacity, and discolours the water. An absence of hill peat means that water flow from uplands to lowlands is no longer regulated by storage and slow release from the peat. An increased incidence of flooding is a likely consequence. And the removal of peat means a loss of habitat for plants and animals that are adapted to the bog, such as the insectivorous sundews. We are also losing the record of recent climate and landscape changes that is locked up in the peat bogs ■

Photographs: Peter Wilson